REMARKS

As a preliminary matter, Examiner Staicovici is thanked for his helpful comments provided during a telephone interview conducted with Applicant's attorney, William L. Bartow, on Thursday, February 8, 2007.

Claims 1-9, 24-32 are pending in the application. Claims 10-15 and 23 have been cancelled herein. Claims 16-22 were previously withdrawn as the result of a restriction requirement. Claims 1 and 24 are amended herein. Claims 30-32 are added. In the most recent office action, all pending claims were rejected as being obvious in light of various combinations of WO 99/01276 (the '276 reference), US 2,922,729 to Dereich and US 3,748,204 to Murayama et al. In light of the amendments presented above and discussed in further detail below, it is respectfully submitted that the cited references do not suggest or disclose all of the limitations contained in the claims. Accordingly, it is requested that the outstanding rejections be withdrawn and that a notice of allowance be issued.

Claims 1-9 and 24-29

Claims 1 and 24 define a method of forming articles from fibrous substrates. Each claim recites *inter alia* the steps of: 1) coating a fibrous substrate with a wet slurry consisting essentially of sodium silicate and a dielectric reducing agent; 2) drying the coated substrate; 3) exposing the substrate to microwave energy to activate the adhesive; and 4) forming the substrate into the shape of an article. It is submitted that none of the cited references disclose, or suggest, the application of a wet slurry that consists essentially of sodium silicate and a dielectric reducing agent. Accordingly, reconsideration and withdrawal of the rejection to these claims, and claims 2-9 and 25-29 which depend therefrom, is respectfully requested.

The '276 reference is cited as teaching the steps of forming a hollow cylindrical core using fibrous substrates. It is admitted in the Action that the '276 reference makes no mention whatsoever of using sodium silicate adhesive, of dielectric reducing agents or of using microwave activation.

Murayama is cited as teaching the use of microwave energy to activate adhesive by heating latent moisture in a substrate. However, Murayama simply teaches the lamination of paper using microwave energy to melt the laminate. Microwaves are used to heat a paper substrate contained between two polymeric resin layers. The resin layers are adhered to the substrate when they are at least partially melted by heat conducted from the paper substrate. There is no mention of solubilizing an adhesive or bonding a fibrous substrate to anything using the claimed adhesive. Murayama does not require an adhesive; rather, the microwave energy is used to melt a portion of the laminate material.

Dereich is cited as teaching a sodium silicate adhesive compound including sugar. The Action submits that it would have been obvious to combine Dereich, which discloses sodium silicate and sugar modified urea-formaldehyde, with Murayama and the '276 reference to render the claimed method obvious. However, the claims as amended are specific and are not suggested by this combination of references.

Amended claims 1 and 24 recite *inter alia* that the wet slurry consists essentially of sodium silicate and a dielectric reducing agent. In the claimed slurry, the two main ingredients, both in terms of volume and functionality, are sodium silicate and sugar. Manifestly, because of the urea-formaldehyde in Dereich, this reference does not teach the claimed adhesive.

Applicant's specification, including paragraphs 20-24, discusses the basic and novel characteristics of using sodium silicate and a dielectric reducing agent to form an adhesive that can be indirectly activated through microwave energy. Sodium silicate, in a dried state, is soluble in heated water. The sodium silicate is modified with a dielectric reducing agent to reduce the effects of the microwave energy on the sodium silicate adhesive. Thus, the dielectric reducing agent increases the amount of time that the activatable web may be exposed to microwave energy before scorching occurs. This provides an increased level of control over the activation process and leads to a stronger bond, due to full adhesion of the sodium silicate with the fibrous web and little or no scorching.

Unlike the claimed combination, Dereich teaches combining sodium silicate adhesive with a compound containing urea-formaldehyde and sugar. (See Dereich Column 3, lines 8-10.) The primary additive to the sodium silicate is urea-formaldehyde, not sugar. In fact, Dereich teaches modifying the urea-formaldehyde with sugar, not modifying the sodium silicate with sugar. To this end, Dereich also teaches that the urea-formaldehyde is always present in greater quantities than the sugar. (See Examples discussed in Columns 3-5 of Dereich.)

Dereich teaches away from the specific combination claimed of sodium silicate and a dielectric and also teaches that urea-formaldehyde is the essential additive. See, e.g., Column 2, lines 38-50. In Dereich, it is desired to increase the water resistance of sodium silicate with an additive. Sugar is highly soluble in water, and would not be considered to increase the water resistance of sodium silicate. (See Declaration of Arnold B. Floyd, Jr., paragraph 7, submitted with Applicant's response to the previous Office Action.) Water resistance is only created by the use of urea-formaldehyde resin in combination with sugar.

Unlike the teachings of Dereich, the use of urea-formaldehyde is undesirable in the present invention. Urea-formaldehyde does not help with activation in the presence of heated water molecules. In fact, exposure to heated water molecules leads to a reversal of the bond forming reactions between urea and formaldehyde, thus breaking down the urea-formaldehyde molecule. (See Conner, A. H. "Urea-formaldehyde adhesive resins." Polymeric Materials Encyclopedia, Volume II, T-Z. 1996. CRC Press, Inc.) Furthermore, unlike sodium silicate, cured urea-formaldehyde is not water resistant. Thus, the addition of urea-formaldehyde to the claimed adhesive would lead to a breakdown of the molecules during activation and a less water resistant structure, once the activated adhesive is cured.

The Applicants claim the essential combination of sodium silicate and a dielectric reducing agent. As discussed above, this combination is not suggested or disclosed in the prior art. In Dereich, these materials are not even the two most prominent ingredients. Rather, in Dereich it is sodium silicate and urea-formaldehyde which are prominent. The addition of urea-formaldehyde to the claimed invention would decrease the strength of the adhesive during activation and make the final product less water resistant. Manifestly, Dereich does not lead to the claimed invention. It is respectfully requested that the rejection be withdrawn relative to independent claims 1 and 24, as well as dependent claims 2-9 and 25-27.

Claims 31 and 32

New independent claim 31 recites that the activatable adhesive is solubilized as the result of migration of moisture from within the fibrous substrate towards the activatable adhesive. As discussed with Examiner Staicovici, this limitation is not suggested or disclosed in the art of record.

The only cited reference mentioning the use of microwave energy is Murayama. Murayama heats latent moisture in a substrate to melt two polymeric resin layers in creating a lamination with a paper layer. (See Declaration of Arnold B. Floyd, Jr., Paragraph 8.) This may be done with or without adhesive. Thus, the adhesive is not a critical factor in Murayama. There is not even a mention of using microwave to activate an adhesive.

Murayama simply teaches the use of microwave energy to heat the water in the paper and, through conduction, to heat the polymeric resin layers, to cause the polymeric resin to melt and form a deeper bond with the paper fibers as compared to that formed in a normal lamination process. (See Murayama, Column 2, Lines 43-52.) In claim 31 the migrating heated water is used to solubilize the adhesive. In Murayama, the heat generated is used to melt the polymer. Thus, the activation method taught in Murayama and the present claims are entirely different.

Because the prior art does not suggest or disclose the use of microwave energy in connection with moisture migration and solubilization of adhesives, allowance of claim 31, and claim 32 which depends therefrom, is respectfully requested.

CONCLUSION

For the reasons set forth above, it is respectfully submitted that the present application is in condition for allowance. Prompt action to that end is respectfully requested.

Respectfully submitted,

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